

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Carpenter et al.

Serial No.: 09/932,860

Filed: August 17, 2001

For: HEATED GAS LINE BODY
FEEDTHROUGH FOR VAPOR AND GAS
DELIVERY SYSTEMS AND METHODS
OF EMPLOYING SAME

Confirmation No.: 6588

Examiner: R. Zervigon

Group Art Unit: 1763

Attorney Docket No.: 2269-4880US

CERTIFICATE OF MAILING

I hereby certify that this correspondence along with any attachments referred to or identified as being attached or enclosed is being deposited with the United States Postal Service as First Class Mail on the date of deposit shown below with sufficient postage and in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

April 11, 2005
Date


Signature

Leta M. Howard
Name (Type/Print)

SUPPLEMENTAL APPEAL BRIEF

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Sirs:

This Supplemental Appeal Brief is submitted in response to the Office Action mailed on January 10, 2005, the three month shortened statutory period for response expires on April 11, 2005, April 10, 2005 being a Sunday. Appellants submit this Supplemental Appeal Brief concurrently with a Request for Reinstatement of Appeal.

1) REAL PARTY IN INTEREST

The real party in interest in the present pending appeal is Micron Technology, Inc., Assignee of the pending application as recorded with the United States Patent and Trademark Office on August 17, 2001, at Reel 012105, Frame 0949.

2) RELATED APPEALS AND INTERFERENCES

Neither the Appellants, the Appellants' representative nor the Assignee is aware of any pending appeal or interference which would directly affect, be directly affected by or have any bearing on the Board's decision in the present pending appeal.

3) STATUS OF THE CLAIMS

Claims 1 through 5 and 7 through 13 are pending in the application.

Claims 6 and 14 through 37 have been canceled.

Claims 1 through 5 and 7 through 13 stand rejected.

Claims 1 through 5 and 7 through 13 are the subject of the present pending appeal.

4) STATUS OF AMENDMENTS

No amendments have been proposed in the present application subsequent the final rejection mailed April 30, 2004.

5) SUMMARY OF THE CLAIMED SUBJECT MATTER

Referring to FIGS. 2 through 4B of the as-filed application, the presently claimed invention is directed to a deposition chamber 200 such as, for example, a chemical vapor deposition (CVD) chamber or an atomic layer deposition (ALD) chamber. (As-filed Application, page 7, ¶ [0025]). The deposition chamber 200 includes a chamber body 202, a chamber lid 204 and a chamber cavity 206 defined within the chamber body 202. A vapor delivery head 218 is positioned within the cavity 206 for discharging the vapor into the chamber cavity 206. A gas delivery path 207 travels through the chamber body 202 via a feedthrough device 208, through the chamber lid 204 and to the vapor delivery head 218. (As-filed Application, pages 7 and 8, ¶ [0026]).

A heating device 238, which includes at least one resistor element 244 having at least a portion thereof disposed within a thermally conductive sheathing 246 is associated with the feedthrough device 208. The heating device 238 includes a nonheated section 242 and a heated section 240, wherein at least a portion of the heated section 240 is configured to conduct heat to the longitudinal body portion 258 of the feedthrough device 208. (As-filed Application, pages 9 and 10, ¶¶ [0031] and [0032]).

A layer of thermal insulation 213 is disposed between at least a portion of the thermally conductive sheathing 246 of the heating device 238 and the chamber body 202 and substantially circumscribes the longitudinal body portion 258 and the at least a portion of the thermally conductive sheathing 246 of the heating device 238. The layer of thermal insulation 213 includes at least a portion which is contiguous with at least one of a surface of the chamber body 202 and a surface of the longitudinal body portion 258. (As-filed application, page 12, ¶ [0042]).

A temperature sensing device 250 is disposed between the layer of insulation 213 and the longitudinal body portion 258 of the feedthrough device 208 and configured to generate a signal representative of a temperature sensed thereby. (As-filed Application, pages 9 and 10, ¶ [0032]; page 12, ¶ [0040]).

The temperature sensing device 250 may include a thermocouple, and the temperature sensing device 250 (whether in the form of a thermocouple or otherwise) may be positioned within the thermally conductive sheathing 246 of the heating device 238. (As-filed Application, pages 9 and 10, ¶ [0032]).

6) GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 through 5 and 7 through 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sajoto et al. (U.S. Patent No. 6,056,823) in view of Whitney (U.S. Patent No. 4,638,150) and further in view of Fukuda et al. (U.S. Patent 5,496,410)

7) ARGUMENTS

STANDARD OF PATENTABILITY UNDER 35 U.S.C. § 103(a)

Rejection of claims under 35 U.S.C. § 103(a) requires that the Patent and Trademark Office (hereinafter “the Office”) must first establish a prima facie case of obviousness. M.P.E.P. § 2142. The standard for establishing a prima facie case of obviousness is set forth in M.P.E.P. § 706.02(j) where it states:

To establish a *prima facie* case of obviousness, three basic criteria must be met.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In view of these standards, and the arguments set forth below, Appellants respectfully submit that the Office has not established a *prima facie* case of obviousness under 35 U.S.C. § 103(a).

A.1 PATENTABILITY OF CLAIMS 1 THROUGH 5, 7 AND 11 THROUGH 13

In an Office Action mailed January 10, 2005, and made Final (hereinafter "the Final Action"), the Examiner rejected claims 1 through 5, 7 and 11 through 13 under 35 U.S.C. § 103(a) as being unpatentable over Sajoto et al. (U.S. Patent No. 6,056,823 – hereinafter "Sajoto") in view of Whitney (U.S. Patent No. 4,638,150 – hereinafter "Whitney") and further in view of Fukuda et al. (U.S. Patent No. 5,496,410 – hereinafter "Fukuda").

Appellants submit that the 35 U.S.C. §103(a) rejections of claims 1 through 5, 7, 11 and through 13 are improper because the references relied upon by the Examiner fail to teach or suggest all of the claim limitations of the presently claimed invention.

Independent claim 1 of the presently claimed invention is directed to a deposition chamber. The deposition chamber comprises: a chamber body having a cavity formed therein; a chamber lid configured to enclose the cavity; a vapor delivery head positioned within the cavity; a feedthrough device positioned in the chamber body, the feedthrough device having a longitudinal body portion and being configured to receive vapor from a vapor source and transfer the vapor therethrough along a pathway toward the vapor delivery head; a heating device including at least one resistor element having at least a portion thereof disposed within a thermally conductive sheathing, the heating device including a nonheated section and a heated section, wherein at least a portion of the heated section is configured to conduct heat to the longitudinal body portion of the feedthrough device; a layer of thermal insulation disposed between at least a portion of the thermally conductive sheathing of the heating device and the chamber body and substantially circumscribing the longitudinal body portion and the at least a portion of the thermally conductive sheathing, the layer of thermal insulation including at least a portion which is contiguous with at least one of a surface of the chamber body and a surface of the longitudinal body portion; and a temperature sensing device disposed between the layer of insulation and the longitudinal body portion of the feedthrough device and configured to generate a signal representative of a temperature sensed thereby.

The Examiner cites Sajoto as teaching a chamber body (12) having a cavity formed therein; a chamber lid (14) configured to enclose the cavity; a vapor delivery head (26)

positioned within the cavity; a feedthrough device(40) having a longitudinal body portion positioned in the chamber body having a lumen defined therein and configured to receive vapor from a vapor source and transfer the vapor therethrough along a pathway toward the vapor delivery head; and a resistance heating device associated with the feedthrough device wherein at least a portion of the resistance heater is positioned within a continual helical groove of the feedthrough device. (See, Final Action, pages 5 and 6).

The Examiner then cites Whitney as teaching a flexible wire heater device (30) including: electrical resistance leads (40) having at least a portion thereof disposed within a stainless steel conductive sheathing; and a layer of thermal insulation (42/44/42) disposed between at least a portion of the thermally conductive sheathing and the heated section of the heating device. (See, Final Action, pages 6 and 7).

The Examiner finally cites Fukuda as teaching a gas line heating device (13a) for a gas conduit which includes a thermocouple (54a) positioned adjacent the gas line heater. (See, Final Action, page 7).

The Examiner states that it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Sajoto's heater with Whitney's heater and Fukuda's thermocouple, by either adhering or welding Whitney's heater to Sajoto's feedthrough device, permitting a length of Whitney's thermal insulation to be contiguous with Sajoto's longitudinal body portion. The Examiner states that motivation to do so would be "to provide a heater with a temperature sensing component to limit elevated temperatures as taught by Whitney and Fukuda." (Final Action, Page 7). The Examiner further states that further [i]nclusive motivation to permit a length of Whitney's layer of thermal insulation to be continuous [sic] with Sajoto's

longitudinal body portion is to conclude the portion of the Whitney's heater that is adhered to Sajoto's longitudinal body portion... and that changes in apparatus dimensions are within the level of ordinary skill in the art." (*Id.*). Appellants respectfully disagree.

Appellants respectfully submit that the combination of Sajoto, Whitney and Fukuda fails to teach or suggest a temperature sensing device, as defined in claim 1, that is *disposed between the layer of insulation and the longitudinal body portion of the feedthrough device*.

First, as has been extensively discussed in the original Appeal Brief and other communications, Appellants submit that Whitney does not provide a temperature sensing device disposed between the layer of thermal insulation and the longitudinal body portion of the feedthrough device configured to generate a signal representative of a temperature sensed thereby. This appears to be one of the reasons that the Examiner has issued another Final Office Action - to include Fukuda and its teaching of a thermocouple. However, the Examiner provides no motivation for placing the thermocouple of Fukuda within the "insulation" (42/44/42) of Whitney. Indeed, Appellants submit that there is no motivation to place Fukuda's thermocouple within the "insulation" of Whitney since Whitney's device is specifically configured as a "self-limiting heater" does not need additional monitoring to maintain its temperature within a desired range.

Second, Appellant's submit that the Examiner conflates Whitney's use of the term insulation in the electrical sense with the Appellants' use of insulation in the thermal sense. Indeed, Whitney's electrical heater would have little utility if the insulation referred to by Whitney was designed to *thermally* isolate the heating element from that which is meant to be heated.

In rejecting claim 1, the Examiner cites Whitney as disclosing:

vii. Electrical resistance leads / resistor elements (40; Figure 4, column 5, lines 19-35) having at least a portion thereof (see Figure 4) disposed within a stainless steel *thermally conductive* sheathing (46; Figure 4, column 5, lines 19-35)...

ix. A layer of *thermal* insulation (42/44/42) column 5, lines 30-35 disposed between at least a portion of the thermally conductive sheathing (46; Figure 4; column 5 lines 19-35) heated section (40) [sic] of the heating device. (Final Action, page 6, emphasis added)

The Examiner's characterization of the Whitney device having a *thermally conductive* sheathing and a layer of *thermal insulation* disposed therein is inconsistent with the purpose and operation of Whitney's heater. In other words, considering FIG. 4 of Whitney, if the insulation (42/44/42) disclosed by Whitney were construed as *thermal* insulation, there would be no point in providing a thermally *conductive* sheathing (46) since the insulation (42/44/42) would prevent or substantially inhibit any thermal energy from ever reaching the sheathing from the internal heater components. In short, if the insulation (42/44/42) were actually *thermal* insulation, such would defeat the purpose of the Whitney device being a "heater" since it would effectively prevent the transfer of heat from the inner components thereof.

Similarly, if one were to rely on the Examiner's interpretation of Whitney (specifically regarding the insulation component thereof), the proposed combination of Whitney's heater with Sajoto's feedthrough device would result in thermal isolation of Whitney's heating element from

Sajoto's feedthrough device and thereby render Sajoto's device inadequate for its intended purpose.

Given that Whitney does not teach the use of thermal insulation to isolate the heating element from the longitudinal portion of the chamber body, Appellants assert that Sajoto teaches a thermocouple disposed external to the radiation shield (Sajoto, FIGS. 2 – 3a), whereas claim 1 of the presently claimed invention requires a temperature sensing device *disposed between the layer of insulation and the longitudinal body portion of the feedthrough device*.

Additionally, while the Examiner relies on Fukuda as disclosing a thermocouple, Fukuda does not appear to teach or suggest an arrangement wherein the thermocouple is *disposed between the layer of insulation and the longitudinal body portion of the feedthrough device* as recited by claim 1 of the presently claimed invention. Similarly, as discussed above, there is simply no motivation to combine Fukuda with Whitney in the manner proposed by the Examiner. Again, Whitney's device is specifically configured to operate as a "self-limiting heater" thereby obviating any need to monitor the temperature of the heater.

Appellants further submit that the combination of Sajoto, Whitney and Fukuda fails to teach or suggest a layer of thermal insulation disposed between at least a portion of the thermally conductive sheathing of the heating device and the chamber body and substantially circumscribing the longitudinal body portion and the at least a portion of the thermally conductive sheathing, wherein at least a portion of the layer of thermal insulation is *contiguous* with at least one of a surface of the chamber body and a surface of the longitudinal body portion.

While the Examiner states that the proposed combination of Sajoto, Whitney and Fukuda would necessarily result in such subject matter being present, Appellants respectfully disagree.

In addition to the foregoing arguments with respect to the Examiner's erroneous interpretation of Whitney's insulation being *thermal* insulation, Appellants submit that the Examiner has also improperly interpreted the limitation of claim 1 that the layer of thermal insulation includes at least a portion *which is contiguous with at least one of a surface of the chamber body and a surface of the longitudinal body portion*. As stated in previous communications, the Examiner has interpreted that this "requirement is equivalent to a claim requiring a relative length between Whitney's sheathing (46; Figure 4) length to Whitney's layer of thermal insulation (42,44; Figure 4) length). (Final Office Action dated April 30, 2004, page 7).

At www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=contiguous,¹

"contiguous" is defined as follows (emphasis in original):

1 : being in actual contact : touching along a boundary or at a point

2 *of angles* : ADJACENT 2

3 : next or near in time or sequence

4 : touching or connected throughout in an unbroken sequence <*contiguous* row houses>

Considering the first and fourth definitions, it is clear that physical contact is contemplated by the term "contiguous" as used in claim 1 of the presently claimed invention. The second definition is clearly not applicable since claim 1 of the presently claimed invention is not comparing or describing relative angles of any structures or components. The third definition is clearly not applicable since claim 1 of the presently claimed invention is not concerned with

¹ Appellants previously submitted the common meaning of "contiguous" in an Amendment mailed June 24, 2004, to which the Examiner requested that an "unabridged definition" be submitted in future communications. Appellants, therefore, submit a copy of this web page, attached hereto in Appendix B, showing the definition of "contiguous."

events during a sequence in time. Moreover, none of the four definitions may be reconciled with the Examiner's interpretation of contiguous to mean that the length of two components be "relative" to one another. (See, Final Action, page 7, paragraph 4).

Considering the common definition of contiguous, and looking at the context of the word as used in claim 1 of the presently claimed invention, Appellants submit that the combination of Sajoto and Whitney fails to teach or suggest a layer of thermal insulation that includes at least a portion *which is contiguous with at least one of a surface of the chamber body and a surface of the longitudinal body portion.*

In light of the foregoing facts, Appellants respectfully submit that claim 1 is allowable over Sajoto, Whitney and Fukuda, either considered separately or in combination.

If an independent claim is nonobvious, then any claim depending from the independent claim is also nonobvious. M.P.E.P. § 2143.03 (citing In re Fine, 5 USPQ2d 1596 (Fed. Cir. 1988)). Thus, Appellants submit that claims 2 through 5, 7 and 11 through 13 are allowable at least by virtue of being dependent from an allowable base claim.

Appellants respectfully request that the rejections of claims 1 through 5, 7 and 11 through 13 under 35 U.S.C. § 103(a) be reversed.

A.2 PATENTABILITY OF CLAIM 8

In the Final Action, the Examiner rejected claim 8 under U.S.C. § 103(a) as being unpatentable over Sajoto in view of Whitney and further in view of Fukuda. However, the Examiner does not explicitly apply the references to claim 8.

Appellants respectfully submit that the combination of Sajoto, Whitney and Fukuda fail

to teach or suggest that the temperature sensing device, which is also configured to generate a signal representative of a temperature sensed thereby (see claim 1), is disposed within the thermally conductive sheath.

Appellants respectfully request that the rejection of claim 8 under 35 U.S.C. § 103(a) be reversed.

A.3 PATENTABILITY OF CLAIMS 9

In the Final Action, the Examiner rejected claim 9 under U.S.C. § 103(a) as being unpatentable over Sajoto in view of Whitney and further in view of Fukuda.

While the Examiner appears to rely on Fukuda as teaching the thermocouple of claim 9, Appellants submit that Sajoto, Whitney and Fukuda fail to teach or suggest that the temperature sensing device (configured and located as set forth in claim 1, from which claim 9 depends) include a thermocouple. More specifically, Sajoto, Whitney and Fukuda fail to teach or suggest a thermocouple *disposed between the layer of insulation and the longitudinal body portion of the feedthrough device* and configured to generate a signal representative of a temperature sensed thereby. Nor has the Examiner provided any motivation to modify the components in a manner that would provide the structure recited by claim 9

Appellants respectfully request that the rejection of claim 9 under 35 U.S.C. § 103(a) be reversed.

A.4 PATENTABILITY OF CLAIM 10

In the Final Action, the Examiner rejected claim 10 under U.S.C. § 103(a) as being unpatentable over Sajoto in view of Whitney and further in view of Fukuda. However, the Examiner does not explicitly apply the references to claim 10.

Appellants respectfully submit that the combination of Sajoto, Whitney and Fukuda fail to teach or suggest that the thermocouple, which is also configured to generate a signal representative of a temperature sensed thereby (see claim 1), is disposed within the thermally conductive sheath.

Appellants respectfully request that the rejection of claim 10 under 35 U.S.C. § 103(a) be reversed.

8) CLAIMS APPENDIX

A copy of claims 1 through 5 and 7 through 13 is appended hereto as "Appendix A."

9) EVIDENCE APPENDIX

The following items are set forth in Appendix B in support of the foregoing arguments:

a print out from www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=contiguous showing the common definitions of "contiguous."

CONCLUSION

Appellants respectfully submit that claims 1 through 5 and 7 through 13 are allowable over the prior art relied upon by the Examiner and respectfully request that the rejections under 35 U.S.C. § 103(a) be reversed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Bradley B. Jensen", with a long horizontal flourish extending to the right.

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